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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,606	03/01/2004	Jiong-Ping Lu	TI 37479	9593

23494 7590 05/03/2006

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EXAMINER
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TRAN, LONG K

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/790,606

Applicant(s)

LU, JIONG-PING

Examiner

Long K. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10, 12-15 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-9, 17 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10, 12 - 15, 18, 19, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/13/06</u> .   | 6) <input type="checkbox"/> Other: ____.                                    |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This office action is in response to Amendment filed on 02/28/2006.
2. Claims **11** and **16** have been cancelled.
3. Claims **1 – 9, 17** and **20** have been withdrawn.
4. Claims **10, 12, 13, 14** and **18** have been amended.
5. Claims **21** and **22** have been added.
6. Claims **10, 12 – 15, 18, 19, 21** and **22** are presented for examination.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 10, 12, 15, 16, 18 and 19 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

8. Claim **10** is objected to because of the following informalities: line 10, change "blanker" to --blanket--. Typo error.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claim **10, 19, 21** and **22** are rejected under 35 U.S.C. 102(e) as being anticipated by Amos et al. (US Patent Application Publication No. 6,846,734).

11. Regarding claim **10**, Amos discloses a method for manufacturing a semiconductor device, comprising:

placing a blanket layer of gate oxide material (18, figures 3 – 16) over a substrate (10, figure 1); and

forming a silicided gate electrode (62,64; figures 11 – 16) over said gate oxide material (18) including:

forming a blanket layer of doped polysilicon material (20, figures 11 – 16) over said blanket layer of gate oxide material; and

forming a blanket layer of a metal alloy (58, figures 13 and 14; column 9, lines 10 – 40) comprising a first metal and a second metal over said blanket layer of polysilicon material (20);

Annealing said blanket layer of an alloy (58) comprising a first metal and said second metal to form a blanket layer of silicided gate electrode material (62/64, column 9, line 41 to column 10, line 34).

Regarding claim **19**, Amos discloses forming source/drain regions (28; figures 4 – 16) in the substrate 14 and forming silicided source/drain contact (52, figures 12 – 16) regions in the source/drain regions 28 subsequent to forming the silicided gate electrode (62, figures 14 – 16). See column 8, line 35 to column 10, line 50.

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Regarding claims **21** and **22**, Amos discloses the first metal for the alloy layer are Co or Ni and the second metal are Co or Ni (column 9, lines 10 – 25).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim **12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Amos et al. (US Patent No. 6,846,734) in view of Thakur (US. Patent no. 6,028,002).

14. Regarding claim **12**, Cabral discloses the claimed invention of claim 10 except for patterning said blanket layer of silicided gate electrode material to form a silicided gate electrode.

However, Thakur shows a silicided stacked gate electrode comprising layers 22, 23, 24 (metal silicide), and 25 being patterned and etched to form metal silicided gate electrode (31, figure 3; column 3, lines 38 – 40).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide a step of patterning a blanket layer of silicided gate electrode material as shown by Thakur for patterning the blanket layer of silicided gate electrode material of Cabral, in order to complete the process of forming the transistor gate (column 4, lines 29 – 31).

15. Claims **13**, **14** and **15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Amos et al. (US Patent No. 6,846,734) in view of Lochtefeld (US. Patent Application Publication no. 2006/0024869).

16. Regarding claim **13**, Amos discloses the claimed invention of claim 10 and particularly a blanket layer of polysilicon material for a silicided gate electrode but fails to teach including implanting a dopant into the blanket of polysilicon material tune a work function of the silicided gate electrode

However, Lochtefeld discloses implanting a dopant into a blanket polysilicon gate material (520, figure 5; [0056]) – [0058] of a silicided gate electrode to achieve a desired conductivity ([0003] and [0071]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include implanting a dopant into a blanket polysilicon gate material of Amos as taught by Lochtefeld in order achieve a desired conductivity which appears to tune a work function of the silicided gate electrode as the claimed invention.

Regarding claims **14** and **15**, Amos discloses a capping layer (60), comprising a transition metal nitride such as TiN, is formed on the surface of the metal alloy (58) (column 9, lines 42+) for preventing oxygen from diffusing into the structures which in turn effect a doping profile of the dopant.

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17. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Amos et al. (US Patent No. 6,846,734).

18. Regarding claim 18, Amos discloses the claimed invention of claim 10 and also teaches the alloy layer comprising a first metal (Co or Ni) and at least another metal (Co or Ni; different from the first metal) having a ratio range of 0.1 to 50 atomic % (column 9, lines 10 – 29) but fails to disclose the ratio of an atomic percent of said first metal to said second metal in said silicide gate electrode ranges from about 9:1 to about 2:3 as the instant claim. In other words, because the reference does not disclose exactly as claimed, it cannot be said that the reference anticipates the claim. However since the reference's ratio range overlaps the claimed ratio range of about 9:1 to about 2:3, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the reference's ratio range to achieve the claimed ratio range, since changing from one range to another range would be obvious to one of ordinary skill in the semiconductor technology art at the time the invention was made.

### ***Conclusion***

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long K. Tran whose telephone number is 571-272-1797. The examiner can normally be reached on Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Tran

April 30, 2006



David Nelms  
Supervisory Patent Examiner  
Technology Center 2800